Acoustic and Electrical Detection to Localize And Measure the Partial Discharge in High Voltage Apparatus

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***Abstract*—The occurrence of the Partial Discharge (PD) inside the high voltage apparatus especially in power transformer due to some defect in its insulation system results in a catastrophic failure. Determination the magnitude and location of the PD inside the transformer is very valuable to avoid the undesired outage. In this paper, two important issues will discuss. The first issue, measuring the magnitude of the PD by the electrical detection device (The partial discharge analysis system MPD 600) that has many kits to the acquisition and analysis for detecting, recording and analyzing the PD. PD Measuring the circuit of MPD600 connected to point to plane according to IEC60270 with an optical interface by computer that have Metronix software in case of partial prediction. The second issue is determining the PD location to start the maintenance process. In order to locate the PD inside the transformer the acoustic signals that emit from the PD source were measured and therefore, the Time difference of arrival (TDOA) between these signals is estimated. A point to plan gap configuration that is mounted in the acrylic tank that contains the insulating oil is used to develop the PD point source. In addition four piezoelectric sensors are fitted on the tank walls to receive the acoustic signals. The sensors are coupled with acoustic PD detector which outputs are applied to four-channel digital oscilloscope to measure the acoustic signals. The proposed algorithm results demonstrate the ability of the algorithm to determine the PD location.**

***Index Terms*—Partial discharge location, Acoustic, Time difference of arrival - PD electrical detection- partial discharge measuring system.**